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## A SOCIOLOGICAL METHODOLOGY FOR INTEGRATED WATER MANAGEMENT AND USER PROFILES: A QUANTITATIVE PROPOSAL

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### ABSTRACT

This paper proposes the inclusion of sociological variables for an efficient management of water resources, in order to help in the understanding and explanation of the perception and social behaviour towards water.

With this aim we suggest a quantitative methodology, aimed at identifying the values, attitudes and behaviour of users and the elaboration of profiles that allows for the determination of the social heterogeneity that can be found within these variables.

The case data have been obtained from the survey, the Sociocultural Determinants of Water Utilisation, part of the EU Aquadapt Project ([www.aquadapt.net](http://www.aquadapt.net)), and carried out in Marina Baixa, a semi-arid region located on the SE coast of Spain

The main conclusions reached with this research, and that should be incorporated into the design of any efficient and fair management of this resource in a region of limited water resources, are the existence of a significant concern with water, which is understood to be a scarce resource, basic for natural life and fundamental for guaranteeing socio-economic development in the region. These reasons are the basis for a saving behaviour in the daily activities and a positive attitude towards a sustainable usage of this resource.

Finally, environment has become a transversal issue, and so it is not possible to draw homogenous socio-demographic profiles, apart from the slight differences mainly related to level of educational level, and sometimes, to age.

**Key-words:** integrated management, water, sustainability, profiles, survey, Marina Baixa.

## INTRODUCTION

On 23<sup>rd</sup> October, 2000 the European Parliament and its Counsel adopted Directive 2000/60/CE or the Water Framework Directive, by which a community action framework was established within the sphere of a policy for water, which provides member States with common directives to prepare them for facing up to problems relating to water.

Among the fundamental contributions these rules make we find the consideration that the hydrographic basin is the best geographical management unit and the concept of integrated water management as the most suitable instrument for managing this resource in a better way. Among the main objectives of this directive appear the general protection of aquatic eco-systems, special protection for unique and valuable habitats and protection of water resources for human consumption. All these objectives must be treated, however, in an integrated way within the administrative framework of the hydrographic basin, the central requirement of this treaty being that the environment should be highly protected in its entirety.

Integrated management of water resources considers water as an integral part of the eco-system, a natural resource and an asset that is both social as well as economic, the quality and quantity of which determine the nature of its use. (Art. 18.8. Agenda 21, 1992). This perspective is at the very heart of the EU's Water Framework Directive, whose actual implementation required and caused multiple research to be carried out into the possibilities of putting into practice an integrated water management model within a European context. Projects such as MULINO, ADVISOR, HarmoniCOP, FIRMA, SLIM or The Arid Cluster are just some of the main examples of studies inspired by this directive, which have been carried out into integrated water management at the hydrographic basin level.

Integrated water management requires an interdisciplinary focus that includes not only the bio-physical aspects that converge to deal with this resource, but also the values and perceptions of the human populations that relate to it and the uses to which they put it. Appropriate water management demands that this resource be also understood as a socio-historical product, the result of the intense interaction between human beings and their surroundings. Every society, at certain times and in certain places, attributes a

meaning and a cultural value to water that, in their turn, have an influence on how it is used and their behaviour towards it. Managers of water resources have to know these values, aptitudes and behaviours and remain attentive to the cultural variations that are occurring in the globalized world, characterized by an intense change produced by technological development. In this line of interpretation, considering water in the socio-culturally accepted sense of the word, its managers and technicians must understand that the meanings and uses of water are not socially homogenous, in other words, in a fragmented society multiple concepts, values and uses relating to this resource appear. Therefore, it is explained that because it is also a source of wealth, bitter conflicts about water, its use and control spring up among different social groups. Each group will try to make its own discourse about water hegemonic, the one that most agrees with its values and better legitimizes its interests socially.

Sustainable water management requires a long term strategy of sustainability, which protects not only biophysical aspects (quality and quantity), but is concerned with a fair and equitable distribution of this resource. With this objective, knowledge of the different meanings of water, its various social values and its multiple and often contradictory social uses is also a demand for the appropriate management of water.

Following this line of sociological interpretation and concentrating on the Spanish situation, opinion polls show how the environment has become a general concern for all social groups, although the youngest ones and those which have access to university level education have the greatest degree of environmental awareness.

It is, however, true that this acquisition of environmental values conflicts with other materialistic and consumerist values. Glaring contradictions arise in the individual and social scales, which are clearly reflected in the distance between the attitudes and behaviours that appear in research into opinions about environmental issues. Pro-environmentalist attitudes and biocentric values are a sharp contrast to non-ecological behaviours. If the population is given the alternative of economic growth or protection of the environment it is common for it to finally choose the first part of this dichotomy, which is invented/constructed by hegemonic social discourse. The immediacy of the danger that would be inflicted by an economic crisis, unemployment and poverty overcome the

sensation of risk that the collective sub-consciousness feels when faced with future environmental problems.

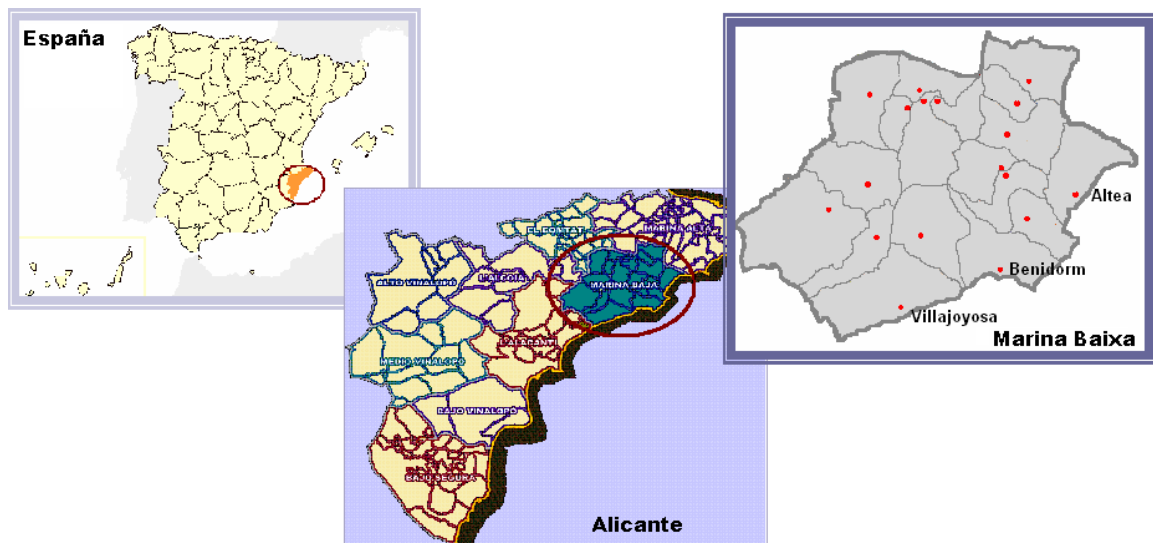
This dialectic, full of contradictions, increases and becomes especially virulent when we are dealing with a resource, which because of its scarcity - or the high demand for it – as in Spain, has an extremely high economic and symbolic value. Water management should be carried within the parameters of sustainability. We need to find a new way of managing our future. Strategy, based on supply, has physical limits that we have probably already exceeded. Sooner than we might imagine it will be necessary to make a complete change in the direction of water management for a demand strategy that prioritizes restrained use of this resource. In the same direction as this reorientation of water management towards sustainable formulae using demand strategy, we need to know in detail the socio-demographic profiles, the perceptions, attitudes and behaviours of all users, whether they be farmers, real estate agents or domestic users.

On the following pages we present the results of research done in Marina Baixa (Alicante Province, Spain) in 2003, within the European Aquadapt<sup>1</sup> Project, in order to find out about the attitudes and behaviour of the users in their homes. We believe the results may be valuable for constructing the necessary integrated management programs for the sustainable use of water in a more effective way. In this sense this article not only presents the results of a specific case study, but also tries to propose a quantitative methodology – and which, therefore, recognises from the outset the epistemological limitations of its objectives and results – with the purpose of collaborating to the construction of a more complete understanding of the sociological aspects of total water management.

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<sup>1</sup> The AQUADAPT (EVK1-CT-2001-00104) project *Strategic tools to support adaptive, integrated water resource management under changing conditions at catchment scale: A Co-evolutionary approach* is a project financed by the European Commission within the Fifth Program. Research and Development Framework in Energy, Environment and Sustainable Development, part of The Arid Cluster, EU. To prepare this document, especially the analysis of the relationship between tourism and urbanism the results of the I+D projects, directed by Dr. Mazon, were also used, “*Analysis and diagnosis of the residential tourist model and design of proposals and restructuring*”, financed by the Ministry of Science and Technology, and “*Foreign residential tourism in Alicante Province: analysis and demand*”, financed by the Culture, Education and Science Council of Generalitat Valenciana.

### DESCRIPTION OF THE CASE STUDY

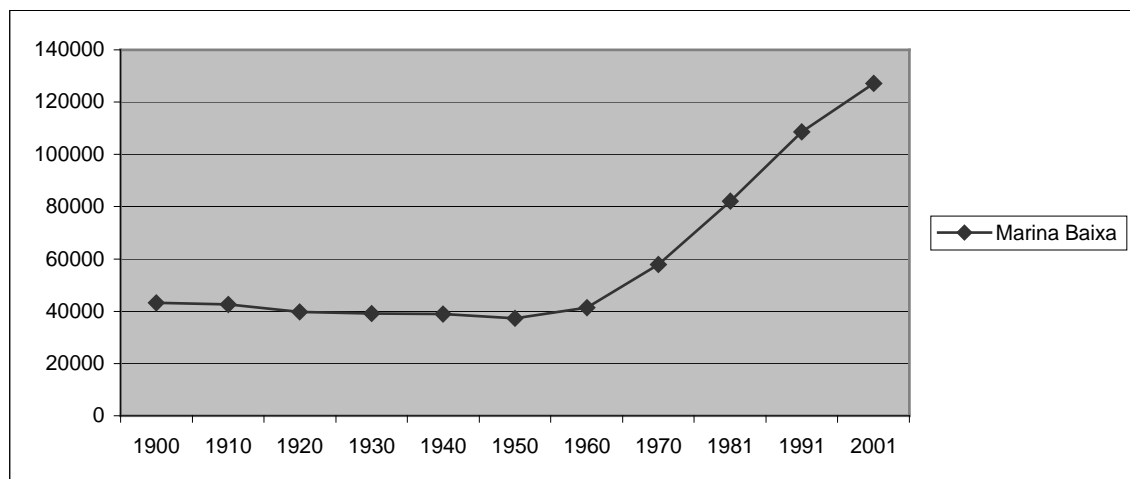


Marina Baixa, which is situated to the north of Alicante Province in southeast Spain, on the Mediterranean coast, is in a semi-arid region of southern Europe. It covers an area of 680 km<sup>2</sup> and, according to official figures, has a population of 125,088. Its topography is divided into a flat coastal region and a mountainous interior, the result of the rising up of the last foothills of the Andalusian mountain range. Local geography can help us understand both population distribution as well as rainfall differences. As we move inland and rise the population becomes scarcer, urban centres are smaller and rainfall is higher. The climate is Mediterranean, with mild winters (a little colder in the mountains) and hot summers. Rainfall is also different inland, where precipitation may be three times more (almost 800mm per annum) than on the plain (around 350 mm per annum, on average). Heaviest rainfall occurs in the autumn, followed by more, heavy rain in the spring. However, the rain fall pattern is characterized by the irregularity of a long dry period, during which more than half the annual rain may fall in just a few hours

The demographic evolution of the region throughout the XXth century divides clearly into two stages: the first, which goes from the beginning of the century until the 60s, and the second that starts at the beginning of the 60s with the tourist boom experienced by the city of Benidorm, Europe's largest leisure centre. No major natural stimuli, the lack of development in the region and the emigration of local inhabitants to more developed locations in Spain and Europe explain the meagre population growth during the first stage.

From the time of the tourist boom, economic growth and the arrival of immigrants change the previous demographic trend. The first contingent of immigrants the region receives during the 60s are labourers, coming from the more backward regions in inland areas of the country, such as Andalusia, Murcia and Castile: these are people who move to the coast attracted by the new labour opportunities created by tourism and construction. At the end of the 70s a second immigrant contingent started settling in Marina Baixa, coming from northern Europe; they chose the region's coastal strip as a place to live when they retired. The development of the Welfare State in their countries of origin, which provided them with large pensions, the lower cost of living in Spain and the mild and sunny climate of Marina Baixa are the reasons that explain its choice as a tourist destination.

*Graph 1 – Demographic evolution of Marina Baixa: 1900-2001*



*Source: INE: Actual population from 1900 to 1981; Census 1991 and 2001.*

The National Population and Dwelling Census of 2001 takes into account the resident population included in the census, but does not reflect the whole population of the region; because of this we have added two new groups, in addition to the one that was in the census. First, the tourists received by the hotel sector in the city of Benidorm - in 2003 the municipality had average annual hotel occupancy of 82% - and secondly, the resident tourist population, which were not included in the census. A significant number of retired residents, who come from other European Union countries, and who, for various reasons, are not counted in the new residential municipalities, live in medium sized townships in the region on a permanent, or almost permanent, basis. To this group we have to add the temporary immigrant labourers, whose number is also unknown. There are no concrete

data on these populations, but just demographic approximations obtained from considering water consumption, or the number of empty and unoccupied dwellings. As a point of reference, other studies have indicated that Benidorm has a population of around 160,000 people during the winter months, but reaches 385,272 in the summer. Altea, for example, that, according to the census, has a population of 15,910, can double its true population in the winter (MAZÓN and ALEDO, 2003).

The start of the tourist development boom in the city of Benidorm, at the end of the 50s in the last century, completely changed the region's economic structure; we can talk about a real *tourist revolution*. Until this date, the economy had been sustained by the primary sector – agriculture and fishing. As from this moment, the reduction in the price of agricultural products, but above all the expansion of the service sector, due to tourism, caused a leap in modernization. The economic structure of the region went from a primary economy to a tertiary one, without going through the development of a secondary sector, as would be proposed in classic studies on modernization. Currently, tourism and construction, along with services associated with these two economic sectors, are the basis of the region's economy.

As far as the hydrological aspect is concerned the reduction in agriculture and the modernizing efforts that this sector has been going through – guided by greater technical incorporation and a more effective control over the use of water – have brought about a significant decrease in water consumption. However, this decline in consumption by the agricultural sector is partially offset by the development of tourism, in the form of residential tourism, and by the demographic growth the region has undergone. Therefore, forecasts of demand for the various sectors for 2002-2012 were as follows:

*Table 1 – Water demand distribution per sector and total supply.*

*Marina Baixa. 2002*

	Supply	Urban demand	Agricultural demand	Industrial demand	Environmental demand	Total demand	Water balance
2002	52	34'9	30'5	1'5	2	68'9	-16'9
2012	52	48'7	30'5	2	2	82'2	-31'2

*Source: Fuertes, Bengochea and Rubert, Tourism and the availability of water resources: the case of Benidorm, Papers on Tourism, n. 26: pp. 29-47, 2000.*

It seems evident from these data, therefore, that the future increase in demand for water will come from the increase in tourism, fundamentally residential tourism, because agricultural demand will remain stable, due to stagnation in the agricultural sector. In any event it is possible that this will decrease as a consequence of (1) a change in the use of the soil, from agricultural to urban and (2) the increasing use of technology in irrigation.

Ever since the 60s there has been a direct relationship between urbanism, tourism and an increase in the demand for water. This relationship began, when in 1956, the first General Urban Organization Plan was drafted for the leisure city of Benidorm. Subsequently, during the 70s and 80s, and taking as a reference Benidorm, the remaining coastal municipalities in this region began their tourist development, focusing on the offer of residential tourism. Over the last twenty years of the XXth century this tourist model has been extended to second category localities.

The high percentage of second and empty homes (51%) indicated by the INE census of 2001, confirms how strongly residential tourism and second homes have taken hold of the region. This fact also points to one of the main characteristics of tourism, its strong seasonality. The seasonality characteristic, where tourist occupation is concentrated in the summer months, makes water shortage problems more serious because the rains are almost non-existent during this period.



## DESCRIPTION OF THE INVESTIGATION OBJECTIVES

The following research was carried out within the context of the Socio-cultural Investigation into the Determinants of Water Utilisation, included in the Aquadapt Project. The objectives of this investigation were to reveal the variations in the determinants of water use within the plans of individuals, families, the community and in the basin. More precisely we were interested in knowing why and under what conditions individuals may change or modify their water consumption patterns (quantities, quality demanded/accepted, times of use), in response to variable economic conditions and to certain demand management tools, such as price or educational initiatives. We researched the attitudes of consumers in relation to water (as a common resource, as a right, as merchandise), as well as its use for domestic, leisure, industrial or agricultural purposes, focusing on variations in the quality of water and its availability (both in terms of volume, as well as access time).

This overall objective was sub-divided into more specific objectives:

Objective 1: to understand the political, socio-cultural and technological determinants of individual and collective water consumption;

Objective 2: to investigate the attitudes of consumers with regard to water as a common resource, a social right and as merchandise.

In this document we show the results of the research carried out in our study of the Marina Baixa<sup>2</sup> region.

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<sup>2</sup> The *Sócio-cultural determinants of water utilisation* investigation, included within the Aquadapt Project, were carried out in four case studies simultaneously: River Hérault basin, France (research directed by BRGM); Kras plateau in Slovenia (research directed by ZRC-SAZU-School of Water Sciences); Marina Baixa region in Spain (research directed by the University of Alicante); River Nene basin in the United Kingdom (research directed by Cranfield University). Subsequently, a comparative analysis was done, the results of which will be published in Aledo, A., and Ortiz, G. "Socio-cultural influences on water utilization: a comparative analysis", in Koundouri, P., Karousakis, K., Assimacopoulos, D., Jeffrey, P. and Lange, M., (Eds.) *Water Management in Arid and Semi-Arid Regions: Interdisciplinary Perspectives*, Edward Elgar, Aldershot. Abril, 2006.

## **METHODOLOGY**

For designing the sample used in carrying out the Aquadapt research the population of Marina Baixa – a total of 125,088 people, according to the population and dwelling census of 2001 – were sub-divided into four areas. The aim was to reflect the differences that exist between the coastal populations, such as those in Benidorm or Altea, the small communities inland, like Beniardá or Benimantell, and the intermediary populations living in the hinterland, like Finestrat or La Nucía. With this division of the population the sample size for a reliability level of 95%, with an error margin of 5%, was 411 questionnaires, that were applied by specially trained researchers in personal interviews at the home of the interviewees, during the months of July to September.

The central part of the questionnaire was divided into nine sections, to which we added a tenth section, for collecting the demographic details of the interviewees, with the purpose of establishing the profiles of the users according to their socio-demographic characteristics.

Therefore, the central group of questions dealt with the following topics: concerns regarding the environment, individual attitude to taking part in public debates about water management, individual perception and knowledge of the management of water resources, individual knowledge of the drinking water cycle, water use and quantities, water use and perception of quality, price of water and associated behaviours, behaviour with regard to economizing water and management and distribution of the resource.

## **MAIN RESULTS**

### **Environmental concerns**

The environment is not a priority issue for the inhabitants of Marina Baixa. This is consistent with the data at a national level coming from other research, like that carried out by the Spanish Centre for Sociological Investigations (CIS). Our research, however, shows that citizens are worried about the environmental situation, both at the local level – where it is understood fundamentally in urban terms – as well as on a global scale. This is shown

by the majority opinion that improvements in the management of water resources is an issue that has to be dealt with immediately. This concern with water problems in the region is also reflected in the fact that water is the problem that most worries them on a worldwide scale (24% of the population interviewed consider water problems as being the most important on the world scale and this option was the most chosen of all the options offered). Despite living in a society classified as being neo-materialistic and hyper-consumerist (BLÜHDORN, 2000), the interviewees show a significantly pro-environmentalist attitude as far as the function of water<sup>3</sup> is concerned (62% are of the opinion that its function is to sustain natural life and 36% say that its function is to satisfy human needs).

It is therefore possible to state that the Marina Baixa society shows high ecological value levels, which would coincide with the post-materialistic theories of the British sociologist, Inglehart (1990). This theory proposes that the development of post-materialistic values, including those of the environmentalists, is the consequence of the change brought about by a generation that was brought up in the security of the Welfare State. The security of knowing that its material needs would be satisfied gave rise to new needs, this time of a post-material character, and caused at the same time the appearance of post-material environmental values. Therefore, a concern with water should not make us immediately think that the interviewees have ecological or post-materialistic values. Water might also be appreciated for its material value, in other words, for how important water is in the region when it comes to economic development, and more especially because of how dependent tourism and agriculture are on it. The importance that the existence, or not, of a society with environmental values might have on forecasts in relation to future sustainable water management obliges us to be cautious when it comes to making statements of this nature that will be modified by the rest of the data that the research collected.

In the description of the socio-economic context the importance of the residential tourist sector in the region stood out, as did its impact on water (ALED0, LA CALLE, PERIBÁÑEZ, 2004). Those interviewed seem to be aware of this relationship when they

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<sup>3</sup> *Which of the following statements most represents your opinion about water?:*

*a) The main function of water is to satisfy human needs: 36%; b) The main function of water is to sustain natural life: 62%.*

indicate that locally the main environmental problems are generalized construction and water problems, the first option being chosen by 16% of the sample and the second by 13%. In turn, this fact suggests that in some way a certain sector of the population of Marina Baixa understands that water problems are related to the increase in demand, due to urban expansion. Other replies appearing in this research, relating to which economic sector consumes most water, seem to confirm this hypothesis (64% point to the tourist sector as the largest consumer of this resource).

The environment is understood in urban terms, which shows the high degree of urbanization that the region is suffering from, and therefore the increasing substitution of the natural world for an artificial world (ALED0, 2004). This fact serves to explain the great ignorance of the population of Marina Baixa about the water cycle (39% and 32%, respectively, recognise they are ignorant about where the water consumed in their homes comes from, and where it goes). This separation of the citizen from the natural world undoubtedly facilitates an economic and utilitarian vision of water, which becomes transferred into a resource, thus losing the symbolic and cultural connotations with which the peasant population of Marina Baixa endowed it before the 1950s. However, this trend is corrected by the spread of environmental education, which disseminates new pro-environmentalist values associated with water. Some of the contradictions that appear in the replies obtained in this research may be the effect of the tension that exists between these two contradictory social constructions with regard to water.

## **INDIVIDUAL ATTITUDE WITH REGARD TO TAKING PART IN PUBLIC DEBATES ON WATER MANAGEMENT**

Despite the debate there is in this region the percentage of interviewees who are not prepared to get involved in this type of discussion is 54%. This can be explained in two ways: on the one hand by the divide that exists between their values and their true ecological attitudes, and on the other by the scant tradition of public participation in debates Spain. Therefore, we think this is an interesting point that should be taken into consideration when designing programs for social participation in public water management.

## **INDIVIDUAL KNOWLEDGE OF THE DRINKING WATER CYCLE**

In the majority of municipalities in the region water management is done by a private company, Aquagest, a fact that is known, they say, by 69% of those interviewed. It is significant that the percentage of “don’t knows” is greater when the question refers to the company that manages the sewage network (33%). This fact seems to indicate that, for those interviewed, it is more important to know where the water comes from, which might be related to a greater concern with personal health, than where the water used in households is disposed of, which denotes less concern with the environment.

Marina Baixa’s drinking water comes mainly from the Guadalest and Amadorio reservoirs, which are supplied with water from the region’s aquifers. The percentage of those who do not know where their drinking water comes from is relatively high. The growing separation between urban areas and the environment produces an increase in ignorance about the workings of the region’s ecological flows and cycles and the formation process of local natural resources.

## **WATER USES AND THE AMOUNT OF WATER CONSUMED**

The tourist sector is perceived as the main consumer of water in this region (64% of those interviewed were of this opinion), distantly followed by agriculture (17%). We did not find such a big difference with regard to the second biggest consumer of this resource: domestic consumption is the option chosen by 31% of those interviewed, followed by the leisure sector (25%).

Existing calculations about water consumption in Marina Baixa, prepared by professors from the University of Alicante, Martín Sevilha and Teresa Torregrosa, from the Aquadapt Project team, indicate that the amount of water destined for urban consumption and for agricultural consumption in this region are similar, with 49% in both sectors of demand, and including in urban consumption the tourist sector. The social perception of those interviewed seems to be distorted, because most of them indicate that tourism is the sector that most consumes water. In a region which historically always had obvious water shortage problems, we might interpret the previous data as a way of blaming tourism for

being the main consumer agent of this scarce resource. But, this fact contrasts with the contribution agriculture makes to the overall economy of the region, which, except in the Calosa area, is insignificant. It also shows how economically dependent the vast majority of the population of Marina Baixa are on tourism.

This is not a fact peculiar to this research. In other research carried out in Spain and in the Province of Valencia, those interviewed value agriculture more than other economic sectors, whose contributions to the national or regional GDP are very much greater. It is possible that this positive view of agriculture is related to a traditional perception of this sector that does not recognize how damaging to the environment the new agricultural and industrial formulae also are.

## **USES FOR WATER AND PERCEPTION OF ITS QUALITY**

The majority of the population does not trust the quality of the water in their taps. However, over the last twenty years or so there have been no health problems in the region related to drinking water straight from the tap. Perhaps this negative perception of tap water is related more to its aesthetic values (bad taste, colour not crystal clear, etc), as well as lack of information on the part of the authorities and water management companies. Therefore, those problems that may be harmful to health (water polluted with nitrates, pesticides or lead) are not mentioned by the interviewees. It is also possible that the publicity campaigns promoted by the water bottling companies has a strong influence on the perception of the poor quality of tap-water. The high percentage of consumers of bottled water (66% of those questioned say they drink bottled water) is a consequence of the previous data. It is difficult to distinguish between that which might be a health concern and what might be the consequence of the hyper-consumerism that is characteristic of present day society. In this sense the cross-referencing we did with the variable "age" seems to show that the consumption of bottled water is more related to hyper-consumerism, because the older interviewees, who did not grow up in a hyper-consumerist society, make up the group that drinks the least amount of bottled water. Here we are faced with an interesting contradiction of the theory of post-materialistic values. A concern with health, which might be considered a post-materialistic value, produces consumerist and anti-ecological behaviour which, at the end of the day, increases the

destruction of the environment, because drinking bottled water generates waste, greater spending on energy due to the transport of bottles, etc.

## **PERCEPTION OF THE PRICE OF WATER AND ASSOCIATED BEHAVIOURS**

According to data supplied by the National Statistics Institute (INE) the average daily consumption of water per inhabitant in the Province of Valencia in 2001 was 156 litres. When asked about the volume they believe they consume in their homes on a daily basis, of those interviewees who say they know (only 10% of the interviewees), 56% say that they consume less than 200 litres. When those that said they did not know how much water they consumed in their homes (90% of those interviewed) were shown a table of possible consumption, 51% indicated that they consumed less than 200 litres per day per household. Therefore, if in an average household in the Province of Valencia consumption rises to between 460-560 litres per day/household the perception of the volume of water consumed is well below the actual situation. There is, therefore, notable ignorance about the domestic water cycle, individual consumption and the consumption of normal household appliances. Therefore, greater information on this subject might increase awareness levels and could, in the final count, reduce water consumption in households. These data are corroborated by the replies to the question about whether they consider that they consume “a lot / neither a lot, nor a little / little water” in their homes: only 11% of those interviewed consider that a lot of water is consumed in their homes, a reply that certainly might vary if the consumers knew exactly how much water they use on a daily basis.

As far as price is concerned 54% of the population does not remember how big their last bill was. This fact seems to indicate that the interviewees do not consider the price of water to be excessively high. So, 51% of the interviewed population, when asked about the price of water, consider that it is either “cheap” or “neither dear, nor cheap”.

As for the series of questions about their predisposition with regard to the introduction of new actions and behaviours as far as economizing water consumption in the home goes, the response was overwhelmingly affirmative. The interviewees were in agreement with using water at times of general lower consumption (57%). Question

relating to an increase in charges as a measure for encouraging saving water produced some interesting replies. When the interviewees were asked if they would take measures to reduce water consumption if their bill were to increase by 25%, the percentage of those who replied in the affirmative decreased to 50%, and those who replied “no” was 43%. However, asked if they would agree to pay an additional amount if it was directly used for protecting the water in the environment, the percentage of those who “very much agree” and who “agree” was 61%. A comparison of these data suggests that, at least in the domestic environment, an increase in the price of water is not understood by consumers as a tool for saving water, because, among other things, they think that they do not consume a lot of water in their homes. Furthermore, in the qualitative interviews carried out with technicians from the water management companies, when asked about the possibility of increasing the level of water saving in the home, the response was always that it would be very difficult under present circumstances to achieve greater domestic saving. So, these results should serve as cause for reflection when considering proposed price increase policies as a tool of sustainability. Greater levels of saving in domestic consumption will have to come from structural changes – legislative and urbanistic, and the construction and design of dwellings – that provide users with new instruments and accessories that allow for a significant water saving.

## **BEHAVIOUR OF DOMESTIC ECONOMIES**

As far as daily behaviour is concerned the water saving practised in homes seems to be sufficiently ingrained in the inhabitants of Marina Baixa. The educational and environmental awareness campaigns mounted by national and regional authorities since the 80s seem to have worked well. These campaigns were especially important during periods of drought and recurrence of this phenomenon has strengthened their effect. There are, however, two arguments that reduce the significance of this fact:

1. The data we analyzed from other research show that the more difficult it is to save water, the less individuals do it;
2. Individual behaviour not only depends on attitude and predisposition, but also on the instruments and accessories available. In other words, the level of domestic saving depends to a great extent on the accessories that the house has available for saving



water. Therefore, the absence of urban legislation that obliges constructors and administrators to introduce these accessories in dwellings is a very strong obstacle to achieving greater levels of domestic saving.

## RESOURCE MANAGEMENT AND DISTRIBUTION

To find out the opinions and preferences of users on how water should be managed and distributed within a context marked by competition for this scarce resource, we asked if they had a swimming pool in their homes, or not, and whether water management should be public, private or mixed. While currently the majority of water management companies are mixed economy companies, there is a tendency for greater privatization of water management. The majority of the population are of the opinion that the companies that supply drinking water should be public. It is important to bear in mind this fact because the opinion of those questioned seems to contradict the strategies proposed by the European Union. There seems to be considerable mistrust on the part of the consumer in relation to the private management of water. The pro-environmentalist view of water as a resource that is basic for nature to function, the relationship that the interviewees seem to establish between health and water and the importance they give to this resource for economic development of the region, could be the basic arguments used for questioning the policy of privatizing water management. Here we get into the debate about the concept of water being understood as a common asset, or merely as an economic resource.

Of the people we interviewed, 21% say they have a private swimming pool, which fits in well with a region in which residential tourism and the climate favour this particular form of enjoyment. This fact contrasts with the replies to the question: "To which sector would you give preference for water consumption during the dry season?" Agriculture is the priority of 58% and 37% indicate tourism. Analysis of this reply, on the one hand reinforces the answer to the question about which sector the interviewees consider to be the greatest consumer of water, and on the other, indicates certain contradictions that exist in the population with regard to their pro-environmental attitudes but non-environmental behaviours. These contradictions are typical of a society beset by paradoxical values: on the one hand sustainable and ecologically economic behaviours and on the other hyper-

consumerism and individual hedonism. The tension between these social values can be seen in the distance that exists between attitudes and behaviours.

## THE CULTURE OF WATER, ACCORDING TO THE SOCIO-DEMOGRAPHIC GROUPS

Usually, in sociological analyses of statistical data there is a chapter in which the basic socio-demographic variables (sex, age, educational level and income) are cross-referenced with the replies to the questions. The aim of this cross-referencing is to check if significant statistical variations appear in the replies that depend on the sex, age, educational level and income of the interviewees. In this way we can extend our knowledge on the different user profiles.

In this sense the results obtained in this research are consistent with other research on environmental themes carried out in Spain and in the Province of Valencia (García, 2004). The environment has been converted into a transversal problem, in other words, all the fundamental socio-demographic groups are aware of the relevance of the problematic environmental issue. The differences that can be found in the different sub-groups into which we divided the socio-demographic variables we analyzed are just nuances on the same theme. Therefore, there are no major differences in the data with respect to the way in which the different socio-demographic sub-groups perceive and use water. Below we consider these differences of nuance and try to explain them sociologically.

### - Sex

With regard to sex, there are no great differences between the replies given by men and women. The women have somewhat less information than the men about the water they consume and its management, but have behaviours that are little more economical in its use than men in specific domestic chores.

### - Income

The income level does not represent a differentiating variable, either. Only in a few questions, in which economic development and environmental protection are in some way contrasted, do the highest and lowest income groups seem to show a more favourable predisposition to economic development proposals. *A priori*, identification of those

individuals belonging to the highest income group, such as those with a better level of education, might lead us to think that this would be the most pro-environmental group of people. Data from this research and from other research we consulted (GÓMEZ, NOYA, PANIAGUA, 1999; GARCÍA, 2004), reject this hypothesis for two reasons: a) because their greater income level allows them to have a greater level of consumption, and b) because their earnings might come from activities that are aggressive to the environment. On the other hand the individuals with lower incomes might be more predisposed to accept greater levels of environmental devastation due to the precarious living conditions in which they find themselves. As far as the perception on the price of water is concerned income appears to be an unrelated variable; the replies given by the group with the lowest income showed no substantial differences from the remaining groups, and in fact, within this group the percentage that thinks that water is cheap is the second highest of all income groups.

- Age

The environment has ceased to be an exclusive theme for young ecologists (GARCÍA, 2004). While the levels of information and environmental awareness is high among the young groups its socialization in a hyper-consumerist lifestyle limits their pro-green behaviour. In this sense it is significant that while we find the highest percentage of concern with the environment among the young, and also replies that consider that the function of water is the satisfaction of natural life, nevertheless this is the group that drinks most bottled water, because of the brand, and that demonstrates the least water saving behaviour in the home.

- Level of education

Level of education level is the socio-demographic variable that most clearly shows significant variations between educational sub-groups. There is a relationship between the level of information, education level and the level of environmental awareness. Due to the late development of the Spanish educational system, especially at university level, it is the young who have the highest levels of education and as indicated previously, those who appear to have the greatest environmental predisposition. Therefore, the expansion in the Spanish education system that has occurred over the last 20 years allows us to presuppose an increase in environmental awareness, which will be driven by the generation change occurring in some segments whose educational levels are higher than those of their parents.

## CONCLUSION

This research shows that the population of Marina Baixa has a notable concern with water, which they understand as being a scarce asset, basic for natural life to function and fundamental for guaranteeing the socio-economic development of the region. These reasons are the basis for their behaviour of saving water in their daily actions and their favourable attitude to the sustainable use of this resource.

There are, however, three elements that conflict with this pro-sustainability attitude:

1. The hyper-consumerist compulsion of post-industrial society, which goes against water saving actions within the domestic environment;
2. The development of unplanned residential tourism in the region, which causes a constant increase in demand in an area that already lacks water;
3. Priority in the social discourse relating to the temporal immediacy of the economic growth / economic crisis binomial over the sustainability / environmental crisis binomial.

The research reflects another significant sociological fact: the environment is configured as a transversal theme. Because of this it is not possible to construct homogenous socio-demographic profiles, other than differences in nuance related fundamentally to the educational level and occasionally to age. Possession of an ecological and sustainable vision of water, or conversely, a developmentalist and economistic position, which understands water to be an economic resource, seems to depend more on individual wills and circumstances than on belonging to a specific socio-demographic group. The same seems to happen with those individuals who either demonstrate, or do not demonstrate, a water-saving behaviour. As we said at the beginning of this section, the population we interviewed appears to be very concerned with this scarce resource, but at the same time these same individuals offer environmentalist and economistic reasons on which to base this concern.

Our research suggests some social actions that might be taken with the purpose of guiding the social management of water in Marina Baixa in the direction of a sustainable model:

1. Reconsideration of the economic model to recognize the environmental limits.
2. A change in urbanistic construction legislation in the sense of introducing technologies for saving water.
3. Greater participation by society in the debates on water and in those bodies that manage it.
4. An increase in educational levels and especially environmental education.

All these are factors that will facilitate the integrated and sustainable management of water in the Marina Baixa region.

In a region with a semi-arid climate, where water is a scarce asset, continuous conflicts relating to water occur between the different groups that have different values and interests. Effective management of water, therefore, includes knowledge of the different perceptions and sensitivities with regard to water, which will facilitate its socially equitable and economically viable distribution.

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Article received on 15.02.2006. Approved on 10.05.2006.